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**Butt Fusion Joint Integrity and Evaluation of NDE
Technologies**

2nd Quarterly Report

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This project started on July 15 2007.

The primary objective of the NYSEARCH/GTI program is to develop a tightly controlled butt heat fusion process through comprehensive testing and evaluation using novel test methods which will help to validate the safe long term performance of Polyethylene (PE) joints under actual field conditions and serve as the basis for an effective reference point for the continued development of advanced Non-Destructive Evaluation (NDE) technologies. Specifically, this program aims to develop comprehensive analytical models to characterize the impact of various types of in-service stress states and fusion process variables; develop comprehensive test data to characterize the long term performance of joints made under parametrically controlled set of fusion variables; develop a set of criteria to identify “suspect joints” – joints that are visually acceptable but fail prior to their intended design life – which can be used as the basis for process improvements and continued technology developments; integration of novel test methods and fusion parameters within applicable industry standards and specifications (ASTM, PPI, 49CFR Part 192).

Project Tasks and Status:

Task #1: Steering Committee Interactions (Ongoing)

NYSEARCH and TEJ group is leading a joint industry steering committee with GTI's assistance consisting of members from each of the respective stakeholders including gas utility companies, regulatory agencies, and pipe/fitting and equipment manufacturers. This is to ensure an objective review of the data/information that is being developed and to obtain support of gas industry of any improvements/changes to Butt Fusion Procedures that will be recommended as a result of the project.

- **Company Surveys- Butt fusion procedures - Status: Complete**
- **Next steering committee meeting scheduled for 1/31/08**

Task #2: Development of an Analytical Model- Status: 50% complete

GTI/TEJ group is developing a comprehensive analytical model to quantify the impact of both the fusion process variables and in-service stress states for PE joints. This is not only fundamental but a necessary first step in terms of developing the appropriate test methods to effectively characterize long-term performance. This step will provide the basis for identifying and improving NDE technologies to evaluate joint integrity and eventually create the fusion improvements needed for field implementation.

- **Review data and published literature - Status: Complete**
- **Analytical Model Development** - A comprehensive matrix for the modeling considerations has been developed based on industry statistics

and previous technical work in the area of heat fusion joining. Preliminary findings will be reviewed and discussed at the January 31 Steering Committee Meeting.

Task #3: Comprehensive Long Term Testing

- Status: Not Initiated

Task #4: Integration within Industry Standards

- Status: Not Initiated

Task #5: NDE Evaluation

- Status: Not Initiated

Task #6: Reporting

- Status: On-going